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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/649,451	08/26/2003	Viktor P. Astakhov	FMC 1443 PUSP / 202-0105	5771
28395	7590	01/26/2006	EXAMINER	
BROOKS KUSHMAN P.C./FGTL 1000 TOWN CENTER 22ND FLOOR SOUTHFIELD, MI 48075-1238			GATES, ERIC ANDREW	
			ART UNIT	PAPER NUMBER
			3722	

DATE MAILED: 01/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/649,451	Applicant(s) ASTAKHOV ET AL.	
	Examiner Eric A. Gates	Art Unit 3722	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 15-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/26/03, 5/7/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 1-14 in the reply filed on 17 November 2005 is acknowledged.
2. Claims 15 –26 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 17 November 2005.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 1-7 and 9-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
 - a. Claim 1 recites the limitation "the tip orifice" in line 31. There is insufficient antecedent basis for this limitation in the claim.
 - b. Claim 1 recites the limitation "the outlet passage" in line 32. There is insufficient antecedent basis for this limitation in the claim.
 - c. Claims 9-11 recite the limitation "the bottom space" in lines 3-4. There is insufficient antecedent basis for this limitation in the claims.

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- d. Claims 9-11 recite the limitation "a longitudinal cross sectional area" in line 3. This appears to be a double inclusion of this term, as this area was previously defined in claim 8.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art. To overcome the rejections below based upon the multiple studies referred to on pages 19-21 of the specification, applicant must submit copies of the studies, including study authors and dates, with the response to this office action.
7. Regarding claim 1, Applicant's Admitted Prior Art discloses a gundrill 100 (Figure 1 of the instant application) for forming deep holes in a body of material as the gundrill is rotated, axially advanced and supplied with drilling fluid, the gundrill comprising: an elongate tubular shank 101 having a driven end, a distal end and a tubular central region extending axially therebetween, the tubular shank having a non-circular fluted cross-section extending from the distal end for at least a substantial portion of the length of the central region providing an elongate flow path between the hole being drilled and

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the periphery of the tubular shank for drilling fluid, which is pumped into an internal passage 104 formed through the tubular shank's central region to exit the hole being drilled and remove chips; and a cutting member 102 affixed to the distal end of the tubular shank, the cutting member having an internal fluid passageway 104 which is coupled to the tubular shank internal passage and terminates in an orifice 118 formed in a tip end surface 115, and a flute 108 extending axially from the tip end surface toward and generally aligned with the fluted cross-section of the tubular shank, the flute defined in part by a secondary flank surface 109 and a generally radially extending primary rake surface 110 having a peripheral rake edge 122 lying on a cylindrical surface coaxial with the central axis, and a generally radially extending cutting edge 113 at the tip end which defines a radially offset point P; wherein the tip end surface of the cutting member cooperates with the hole being drilled to define a bottom space area therebetween which receives drilling fluid through the tip orifice 118 and discharges drilling fluid through the outlet passage which is generally bounded by the distal edge of the secondary flank surface 109 and the bottom of the hole being drilled, wherein the drilling fluid flows through the outlet passage into the elongate fluid return path initially forming a maximum angle β , relative to the hole axis when viewed radially.

8. Figure 1 of Applicant's Admitted Prior Art does not disclose that β is greater than sixty-six degrees in order to effectively cool the tip cutting edge with minimal drilling fluid stagnation. However, pages 19-20 of the specification of the instant application discloses multiple prior art studies that have been performed that teach that a stagnation zone is created when β is 65 degrees or less, thereby showing that

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having an angle of 66 degrees or higher is desirable for the purpose of effectively cooling the tip cutting edge by minimizing drilling fluid stagnation. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have combined Applicant's Admitted Prior Art with the angle beta taught in the multiple studies of Applicant's Admitted Prior Art in order to improve the cutting fluid cooling to the tip edge.

9. Regarding claim 2, the multiple studies of Applicant's Admitted Prior Art teach that having the minimum cross-sectional area of the outlet passage less than a longitudinal cross sectional area of the bottom space taken along the hole axis increases static drilling fluid pressure, as disclosed on pages 20-21 of the specification.

10. Regarding claims 3-7, the multiple studies of Applicant's Admitted Prior Art disclose the claimed invention except for the specific value ranges given in each of the claims. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have made these ranges more specific than those given in claims 1 and 2, because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

11. Regarding claim 8, Applicant's Admitted Prior Art discloses a gundrill for forming deep holes in a body of material as the gundrill is rotated, axially advanced and supplied with drilling fluid, the gundrill comprising: an elongate tubular shank 101 having a driven end, a distal end and a tubular central region extending axially therebetween, the tubular shank having a non-circular fluted cross-section extending from the distal end

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for at least a substantial portion of the length of the central region providing an elongate flow path between the hole being drilled and the periphery of the tubular shank for drilling fluid which is pumped into an internal passage 104 formed through the tubular shank's central region to exit the hole being drill and remove chips; and a cutting member 102 affixed to the distal end of the tubular shank, the cutting member having an internal fluid passageway 104 which is coupled to the tubular shank internal passage and terminates in an orifice 118 formed in a tip end surface, and a flute 108 extending axially from the tip end surface toward and generally aligned with the fluted cross-section of the tubular shank, the flute defined in part by a secondary flank surface 109 and a generally radially extending primary rake surface 110 having a peripheral rake edge 122 lying on a cylinder coaxial with the central axis, and a generally radially extending cutting edge 113 at the tip end which defines a radially offset point P; wherein the tip end surface of the cutting member cooperates with the hole being drilled to define a bottom space area therebetween which receives drilling fluid through the tip orifice and discharges drilling fluid through an outlet passage, which is generally bounded by the distal edge of the secondary flank surface and the bottom of the hole being drilled.

12. Figure 1 of Applicant's Admitted Prior Art does not disclose that the outlet passage has a minimum cross-sectional area which is less than a longitudinal cross-sectional area of the bottom space area taken along the hole axis. However, pages 19-21 of the specification of the instant application discloses multiple prior art studies that have been performed that teach having the minimum cross-sectional area of the outlet

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passage less than a longitudinal cross sectional area of the bottom space taken along the hole axis is desirable for the purpose of increasing the static drilling fluid pressure. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have combined Applicant's Admitted Prior Art with the cross-sectional areas taught in the multiple studies of Applicant's Admitted Prior Art in order to improve the cutting fluid cooling to the tip edge.

13. Regarding claims 9-11, the multiple studies of Applicant's Admitted Prior Art disclose the claimed invention except for the specific value ranges given in each of the claims. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have made these ranges more specific than those given in claims 1 and 2, because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

14. Regarding claims 12-14, the multiple studies of Applicant's Admitted Prior Art teach that a stagnation zone is created when beta is 65 degrees or less, thereby showing that having an angle of 66 degrees or higher is desirable for the purpose of effectively cooling the tip cutting edge by minimizing drilling fluid stagnation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have made this range more specific than that taught in the multiple studies, because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

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Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

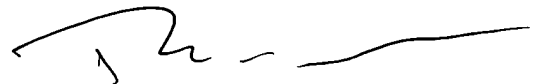
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric A. Gates whose telephone number is 571-272-5498. The examiner can normally be reached on Monday-Thursday 7:45-6:15.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Boyer Ashley can be reached on 571-272-4502. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



EAG
19 January 2006



BOYER D. ASHLEY
SUPERVISORY PATENT EXAMINER